

Mr. Steve Calanog
Federal On-Scene Coordinator
U.S. Environmental Protection Agency, Region 9
75 Hawthorne Street
San Francisco, California 94105

Arcadis U.S., Inc.
320 Commerce
Suite 200
Irvine
California 92602
Tel 714 730 9052
Fax 714 730 9345
www.arcadis.com

Subject:

Notification of Contractor Selection and Biological Resources Information Inquiry
Administrative Settlement Agreement and Order on Consent
CERCLA Dockets No. 09-2017-02 and 06-02-17
BNSF Haystack No. 1 AUM Site
McKinley County, New Mexico

ENVIRONMENT

Date:

May 30, 2017

Contact:

Maher Zein, PhD, PE

Dear Mr. Calanog:

Phone:

714.508.2667

Email:

maher.zein@arcadis.com

Our ref:

CA000860

Mr. Steve Calanog
May 30, 2017

aforementioned agencies prior to the May 30, 2017 deadline as requested in the AOC. A summary of the biological resources inquiry findings will be provided in a technical memorandum, which will be submitted to the EPA within 30 days of receipt of all relevant information.

If you have any questions or need additional information, please feel free to call me at 714.508.2667 or email me at maher.zein@arcadis.com.

Sincerely,

Arcadis U.S., Inc.



Mahe Zein, PhD, PE
Project Manager

Copies:

Warren Zehner – U.S. EPA Region 6

Dr. Donald Benn, Navajo Nation EPA

Vivian Craig – Navajo Nation EPA

Mike Makerov – BNSF

Martina Schlauch Jones, Todd O'Brien, and Drew Werth – Arcadis

Enclosures:

Attachment

- 1 Arcadis Quality Management Plan

Environment Business Line

Quality Management Plan

BNSF Railway Company

Haystack No. 1 Abandoned Uranium Mine

McKinley County, New Mexico

Level II Document

May 30, 2017



Todd O'Brien
Quality Assurance Officer



Maher Zein, Ph.D., P.E.
Certified Project Manager



Drew Werth
Associate Project Manager and Designated Quality Leader

Quality Management Plan

BNSF Haystack No. 1 AUM

Prepared by:
Arcadis U.S., Inc.
320 Commerce
Suite 200
Irvine
California 92602
Tel 714 730 9052
Fax 714 730 9345

Date:
May 30, 2017

This document is intended only for the use of the individual or entity for which it was prepared and may contain information that is privileged, confidential and exempt from disclosure under applicable law. Any dissemination, distribution or copying of this document is strictly prohibited.

Distribution List	viii
1. Introduction	1-1
1.1 Company Background	1-1
1.2 Quality Management Plan (QMP)	1-2
1.2.1 Purpose and Scope	1-2
1.2.2 Review and Approval	1-2
1.2.3 Control and Distribution	1-2
1.2.4 Distribution List	1-3
1.2.5 References	1-3
2. Part A – Management Systems	2-1
2.1 Management and Organization	2-1
2.1.1 Quality Policy	2-1
2.1.2 Management	2-1
2.1.3 Organization	2-2
2.1.4 Responsibility and Authority	2-4
2.1.5 Assessment and Review	2-4
2.1.6 References	2-5
2.2 Quality System	2-5
2.2.1 Purpose	2-5
2.2.2 Scope	2-6
2.2.3 Definitions	2-6
2.2.4 Responsibilities	2-7
2.2.5 Procedures	2-7
2.2.6 Documentation and Records	2-8
2.2.7 References	2-8
2.3 Competence of Personnel	

2.3.2	Scope	2-9
2.3.3	Responsibilities	2-9
2.3.4	Procedures	2-9
2.3.5	Documentation and Records	2-10
2.3.6	References	2-10
2.4	Guidelines on Acquisition of Items and Services	2-10
2.4.1	Purpose	2-10
2.4.2	Scope	2-10
2.4.3	Definitions	2-10
2.4.4	Responsibilities	2-11
2.4.5	Procedures	2-11
2.4.6	Documentation and Records	2-12
2.4.7	References	2-12
2.5	Documented Information	2-12
2.5.1	Purpose	2-12
2.5.2	Scope	2-12
2.5.3	Definitions	2-12
2.5.4	Responsibilities	2-13
2.5.5	Procedures	2-13
2.5.6	References	2-14
2.6	Information Technology	2-14
2.6.1	Purpose	2-14
2.6.2	Scope	2-1

2.6.7	References	2-15
2.7	Planning	2-15
2.7.1	Purpose	2-15
2.7.2	Scope	2-16
2.7.3	Definitions	2-16
2.7.4	Responsibilities	2-16
2.7.5	Procedures	2-16
2.7.6	Documentation and Records	2-17
2.7.7	References	2-17
2.8	Operation	2-17
2.8.1	Purpose	2-17
2.8.2	Scope	2-17
2.8.3	Definitions	2-17
2.8.4	Responsibilities	2-18
2.8.5	Procedures	2-18
2.8.6	Documentation and Records	2-18
2.8.7	References	2-18
2.9	Performance Evaluation	2-19
2.9.1	Purpose	2-19
2.9.2	Scope	2-19
2.9.3	Definitions	2-19
2.9.4	Responsibilities	2-20
2.9.5	Procedures	2

2.10.2	Scope	2-21
2.10.3	Definitions	2-21
2.10.4	Responsibilities	2-22
2.10.5	Procedures	2-22
2.10.6	Documentation and Records	2-22
2.10.7	References	2-22
3.	Part B – Collection and Evaluation of Environmental Information	3-1
3.1	Planning and Scoping	3-1
3.1.1	Purpose	3-1
3.1.2	Scope	3-1
3.1.3	Definitions	3-1
3.1.4	Responsibilities	3-2
3.1.5	Procedures	3-2
3.1.6	Documentation and Records	3-2
3.1.7	References	3-3
3.2	Design of Information Collection Operations	3-3
3.2.1	Purpose	3-3
3.2.2	Scope	3-3
3.2.3	Responsibilities	3-3
3.2.4	Procedures	3-4
3.2.5	Documentation and Records	3-4
3.2.6	References	3-4
3.3	Performance of Planned	

3.3.5	Procedures	3-6
3.3.6	Documentation and Records	3-6
3.3.7	References	3-6
3.4	Performance Evaluation	3-7
3.4.1	Purpose	3-7
3.4.2	Scope	3-7
3.4.3	Definitions	3-7
3.4.4	Responsibilities	3-8
3.4.5	Procedures	3-8
3.4.6	Documentation and Records	3-8
3.4.7	References	3-9
3.5	Assessment and Verification of Information	3-9
3.5.1	Purpose	3-9
3.5.2	Scope	3-9
3.5.3	Definitions	3-9
3.5.4	Responsibilities	3-10
3.5.5	Procedures	3-10
3.5.6	Documentation and Records	3-11
3.5.7	References	3-11
4.	Part C – Design, Construction, and Operation of Environmental Technology	4-1
4.1	Planning and Scoping	4-1
4.1.1	Purpose	4-1
4		

4.1.7	References	4-2
4.2	Design of Systems	4-2
4.2.1	Purpose	4-2
4.2.2	Scope	4-2
4.2.3	Definitions	4-3
4.2.4	Responsibilities	4-3
4.2.5	Procedures	4-3
4.2.6	Documentation and Records	4-4
4.2.7	References	4-4
4.3	Construction/Fabrication of Systems and Components	4-4
4.3.1	Purpose	4-4
4.3.2	Scope	4-4
4.3.3	Definitions	4-4
4.3.4	Responsibilities	4-5
4.3.5	Procedures	4-5
4.3.6	Documentation and Records	4-5
4.3.7	References	4-5
4.4	Operation of Environmental Technology	4-6
4.4.1	Purpose	4-6
4.4.2	Scope	4-6
4.4.3	Definitions	4-6
4.4.4	Responsibilities	4-6
4.4.5	Procedures	4-7
4.4.6</		

4.5.2	Scope	4-7
4.5.3	Definitions	4-8
4.5.4	Responsibilities	4-8
4.5.5	Procedures	4-8
4.5.6	Documentation and Records	4-8
4.5.7	References	4-8
4.6	Verification and Acceptance of Systems	4-8
4.6.1	Purpose	4-8
4.6.2	Scope	4-9
4.6.3	Definitions	4-9
4.6.4	Responsibilities	4-9
4.6.5	Procedures	4-9
4.6.6	Documentation and Records	4-9
4.6.7	References	4-10

Figures

Figure 1	Organizational Chart	Error! Bookmark not defined.
Figure 2	Quality System Loop	Error! Bookmark not defined.
Figure 3	Quality System Concept	2-8

Distribution List

- **Maher Zein** – Arcadis, Certified Project Manager
- **Drew Werth** – Arcadis, Associate Project Manager and Designated Quality Leader
- **Todd O'Brien** – Arcadis, Project Quality Assurance Officer
- **Mike Makerov** – BNSF Railway Company (BNSF), Manager Environmental Remediation
- **Steve Calanog** – U.S. Environmental Protection Agency (EPA) Region 9, On-Scene Coordinator
- **Warren Zehner** – U.S. EPA Region 6, Alternate On-Scene Coordinator
- **Donald Benn** – Navajo Nation EPA, Executive Director
- **Vivian Craig** – Navajo Nation EPA, Senior Environmental Specialist
- **Arcadis U.S., Inc.** – Project File

This Quality Management Plan is maintained by the Quality Assurance (QA) Officer for the BNSF Haystack No. 1 AUM project. It is the responsibility of the QA Officer to maintain this document and the most recent version is distributed to the personnel on the list in Section 1.2.4.

NOTE: Copies of this document or portions of it may also be included in proposals or distributed to clients. Those copies will be identified as an “Uncontrolled Copy” and will not be tracked for notification of revisions.

Quality Management Plan

BNSF Haystack No. 1 AUM
May 2017

1. Introduction

1.1 Company Background

The core company now known as Arcadis U.S., Inc. (Arcadis) was founded as Geraghty & Miller, Inc. in 1957. Geraghty & Miller, Inc. was acquired by Heidemij, now Arcadis, in 1993. The family of Heidemij companies throughout the world adopted the name Arcadis in 1997 to better represent our global presence and mission. In the United States, Arcadis has grown and expanded its capabilities through corporate mergers with trusted firms such as Reed and Associates; Acurex; Piedmont Olsen & Hensley; WSBC Civil Engineers, Inc.; Reese, Macon and Associates, Inc.; Finkbeiner, Pettis & Strout, Inc.; Lawson Noble and Webb Associates, BHR, Inc.; Construction Dynamics Group, Inc.; Lewis and Zimmerman Associates, Inc.; Greystone Environmental Consultants; and Blasland, Bouck & Lee, Inc.; PinnacleOne; LFR; RTRL, Malcolm Pirnie, and EC Harris.

Through the incorporation of the high quality service capabilities brought by these firms, Arcadis continues to expand its role as a world-class institution with worldwide capabilities in developing and implementing solutions for the built and natural environment. The Arcadis Chief Executive Officer has charged the Project Management Office within the corporation with the development of a quality system. Under that charge, the Arcadis Environment Business Line (ENV) has developed a Quality Management System (QMS) that was rolled out in November 2012 and is described in the ENV QMS Quality Manual.

The ENV QMS touches on almost every aspect of our day-to-day activities. These activities include identifying projects and clients to pursue, preparing winning proposals, selecting qualified teams (i.e., "Best Team" approach), and performing safe, profitable work that meets the established quality expectations. The ENV QMS involves preparing and implementing a Project Quality Plan (PQP); managing the technical, financial, and health and safety aspects of the project; successfully performing the project to meet quality expectations; and delivering project documentation. Success in these activities relies on a Continuous Improvement Program (CIP), which identifies and incorporates opportunities for improvement as best practices in our systems, processes, and procedures.

Consistently meeting our clients' expectations and continuously improving are the foundation of our Quality Mission to provide consistent, valuable service to our clients. We provide services in a manner that identifies and focuses on our clients' requirements and expectations. This mission is met by building value-added activities into appropriate work efforts, not by simply adding quality-related tasks to our normal day-to-day activities.

Quality Management Plan

BNSF Haystack No. 1 AUM
May 2017

1.2 Quality Management Plan (QMP)

This document is designed to describe how the ENV QMS is applied to the BNSF Haystack No. 1 AUM project in a format that is compliant with the Quality Management Systems for Environmental Information and Technology Programs – Requirements with Guidance for Use (American Society for Quality [ASQ]/American National Standards Institute [ANSI] E4:2014). The QMP is based upon the core principles of continuous improvement and is guided by the U.S. Environmental Protection Agency's (USEPA's) QA/R-2 – Requirements for Quality Management Plans (USEPA 2006). Additional details on the ENV Division's QMS can be found in the ENV Quality Manual (Level I document) and on the ENV quality website accessible to all ENV staff.

1.2.1 Purpose and Scope

This QMP describes the policies, organizational structure and responsibilities, procedures, and systems used by Arcadis ENV for the purpose of managing the quality of the products and services it provides to the BNSF Haystack No. 1 AUM project. This QMP is a Level II document that applies specifically to contracts, programs, and projects performed for BNSF. Following the description of the management system in Part A, Section 2, each element of the QMP is described using the operating procedure format headings: Purpose, Scope, Definitions, Responsibilities, Procedures, Documents and Records, and References. Level III documents (PQPs, Client Quality Plans [CQPs], and/or Quality Assurance Project Plans [QAPPs]) will be written to further describe QA procedures for specific projects.

1.2.2 Review and Approval

The signature page indicates Arcadis management approval of the contents of this document. Management will review this document annually. The responsibility for maintaining this document lies with the Arcadis QA Officer for the BNSF Haystack No.1 AUM project.

1.2.3 Control and Distribution

Revisions to this document shall be controlled as follows:

- The Arcadis QA Officer for the BNSF Haystack No. 1 AUM project must approve all revisions prior to their incorporation and distribution.
- Each section has an effective date identified in the header of each page.
- The QA Officer shall maintain permanent records of all revisions and versions.

Quality Management Plan

BNSF Haystack No. 1 AUM
May 2017

This QMP is distributed in an electronic PDF file to the Arcadis managers listed in Section 1.2.4 and personnel working on site activities (the team). Distribution will be the responsibility of the BNSF Haystack No. 1 AUM project QA Officer. The QA Officer will maintain records of revision distribution.

1.2.4 Distribution List

The following Arcadis personnel will receive a copy of this QMP directly from the QA Officer. It is the responsibility of the QA Officer to redistribute the QMP to these staff members when changes or revisions are made.

- Account Manager
- Certified Project Manager (CPM)
- Associate Project Manager (APM)
- Task Managers
- Quality Consultant
- Deputy Quality Consultant (DQC), if any.

1.2.5 References

- ASQ/ANSI. 2014. Quality Management Systems for Environmental Information and Technology Programs – Requirements with Guidance for Use. ASQ/ANSI E4:2014.
- Arcadis 2015. ENV Quality Manual. June 2015.
- USEPA. 2001. Requirements for Quality Management Plans. USEPA QA/R-2. EPA/240/B-01/002, Reissued May 2006.

Quality Management Plan

BNSF Haystack No. 1 AUM
May 2017

2. Part A – Management Systems

2.1 Management and Organization

2.1.1 Quality Policy

The ENV's quality policy is to facilitate Arcadis' commitment to quality and client satisfaction by providing high-value systems and tools that:

1. Enhance our ability to efficiently deliver accurate, appropriate, and consistent work and work projects for our clients; and
2. Support our culture of continuous improvement and focus on quality performance.

2.1.2 Management

ENV management is committed to implementing and continuously improving a QMS. The ENV QMS promotes continuous improvement in the quality and safety of our services and:

- Defines Arcadis and client quality needs
- Assigns responsibilities to promote quality
- Applies appropriate resources and personnel
- Implements effective procedures
- Plans, executes, monitors, controls, and improves processes for continuous improvement.

Through the effective application of our QMS, the ENV strives to provide services that meet client expectations. This is demonstrated by continuously communicating the importance of meeting client, regulatory, and legal requirements and Arcadis quality policies and procedures.

The following is a general introduction to some important components of the ENV QMS. More detailed descriptions of these components and systems are presented in the ENV Division's Quality Manual available on the ENV quality website located on The Source US and accessible to all ENV staff.

Each of the ENV support programs (Client Development, Operations, Technical Knowledge and Innovation [TKI], and Health and Safety) has a role in developing, implementing, and maintaining the QMS. To facilitate

Quality Management Plan

BNSF Haystack No. 1 AUM
May 2017

quality coordination across the ENV, the QMS is managed by an ENV QMS Leadership team. The ENV QMS Leadership team reports to the ENV Project Management Excellence (PMX) Director.

An important goal of the ENV QMS is to implement quality and CIPs to meet client and Arcadis expectations. To accomplish this goal, the QMS includes assignment of a designated person on the project team who is responsible for monitoring and maintaining project quality. These project quality leaders are called Quality Consultants and Deputy Quality Consultants (DQCs). Independent Quality Consultants are assigned to complex and higher-risk projects and programs, while for many smaller, lower risk projects, the CPM may serve in that role. TKI Technical Practice Area Managers work with CPMs, Operations Directors, and Account Managers to identify qualified Quality Consultants, utilizing resources from TKI, Client Development, and Operations, as appropriate. A more complete description of roles and responsibilities is presented in the ENV Quality Manual.

Another equally important role the Quality Consultant serves is in identifying technical resources, oversight of proposal or program quality efforts, quality reviews and appraisals, and continuous improvement. Quality Consultants provide project- or program-specific guidance to the Account Manager, CPM, DQCs, and project team regarding Arcadis and client quality goals and technical discipline involvement and review to verify that the ENV QMS is implemented at the project level. For some projects and programs, the Quality Consultant provides high-level consulting to address specific technical and quality needs. The Quality Consultant also has a primary responsibility for conducting independent project and program reviews and incorporating review results in Arcadis CIP. More detailed information regarding the Quality Consultant role and responsibilities is provided in the ENV Quality Manual.

In the ENV QMS, CPMs work with Account Managers and Quality Consultants to lead implementation of the QMS on a project-specific basis. For larger clients, the Account Manager has overall responsibility for quality of the project work done by the client team. However, quality is the responsibility of every Arcadis employee. ENV management and employees must work as a team to build quality into every project and deliver the consistent, valuable services our clients expect. To accomplish this goal, ENV Senior Management is responsible for providing the resources and authority to implement the QMS. Senior Management also provides measures to verify that the ENV QMS is understood and implemented by ENV employees.

2.1.3 Organization

The general organizational chart for the BNSF Haystack No. 1 AUM project is shown in Figure 1. The figure illustrates the separation between the project

Quality Management Plan

BNSF Haystack No. 1 AUM
May 2017

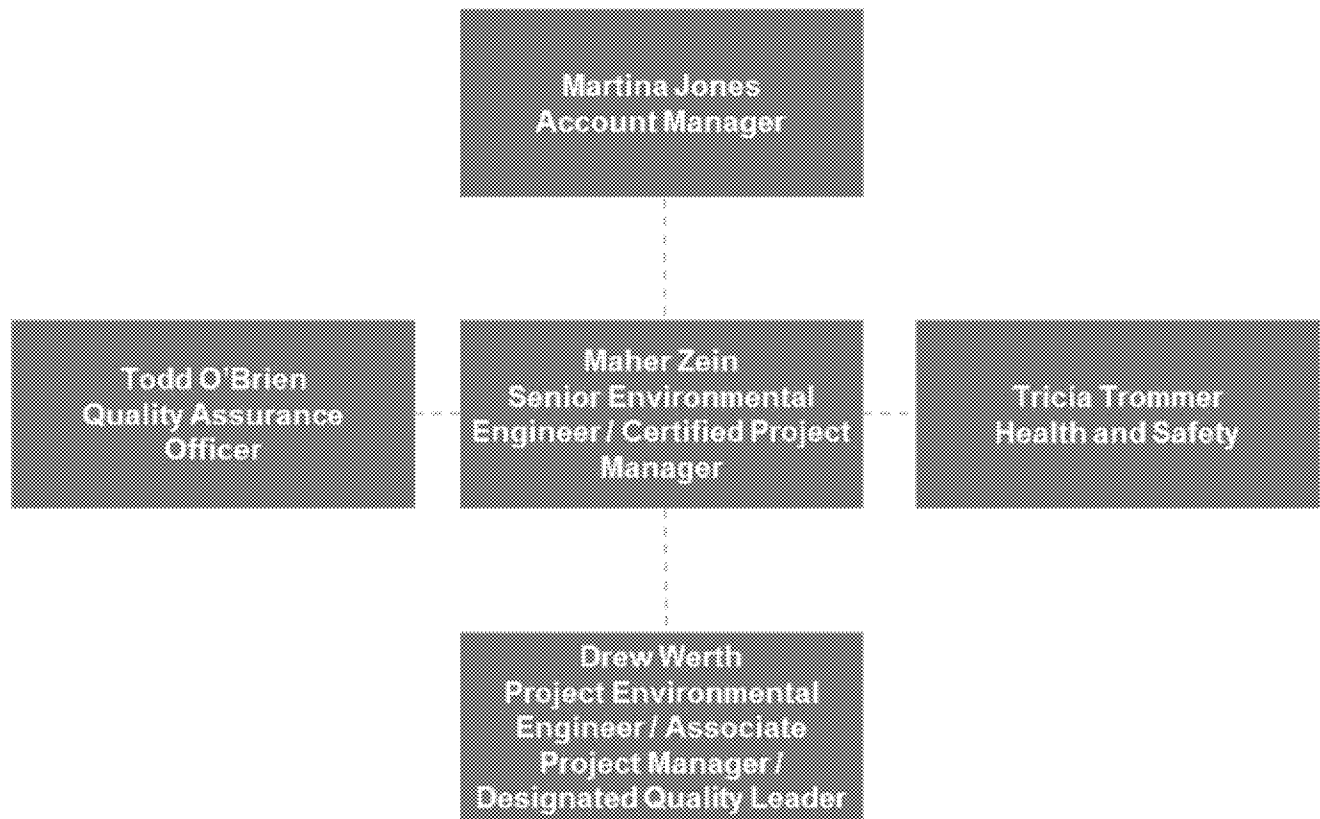


Figure 1 Organizational Chart

Quality Management Plan

BNSF Haystack No. 1 AUM
May 2017

2.1.4 Responsibility and Authority

- It is the responsibility of the Account Manager and/or CPM to identify customer requirements. The designated QA Officer supports the Account Manager and/or CPM in interpretation of requirements. If there is a disagreement in interpretation, the Account Manager and/or CPM is the final authority. This applies to projects performed for both internal and external customers.
- The CPM and/or APM have overall responsibility to define, plan, and control a project. The CPM/APM determines client's objectives, the scope of work, and the project's compensation and profitability. The CPM/APM is responsible for controlling project performance.
- The Account Manager and/or CPM has overall responsibility for Arcadis performance on the BNSF Haystack No. 1 AUM project. The Account Manager/CPM monitors project activities and has authority to modify project decisions when the change is not inconsistent with the contract or client requirements.
- APMs and/or Task Managers are responsible for executing project tasks to produce project products and to assist the CPM in defining, planning, and controlling the project.
- Management will provide resources to perform the assessment, verification, and testing of research findings and products.
- The QA Officer for a project will have the project resources available to conform to customer requirements.
- The QA Officer develops and implements the BNSF Haystack No. 1 AUM project Quality System with the support of CPMs/APMs and Supervisors.
- Details of the responsibilities, authorities, and functions that manage, perform, and verify work affecting quality are defined and documented.

2.1.5 Assessment and Review

Arcadis management in cooperation with the QA Officer assesses and documents the adequacy of the BNSF Haystack No. 1 AUM project Quality System on an annual basis. This begins as a review of changes and/or revisions to this QMP. Objectives of this assessment and review include:

- Verification that all those with responsibility or authority for the BNSF Haystack No. 1 AUM project Quality System understand their roles and responsibilities and are performing them accordingly.

Quality Management Plan

BNSF Haystack No. 1 AUM
May 2017

- Verification that the BNSF Haystack No. 1 AUM project Quality System tools are available to all personnel assigned to the project.
- Verification that the BNSF Haystack No. 1 AUM project Quality System has been implemented as defined by this QMP.
- Verification that Arcadis management has provided sufficient resources to implement the BNSF Haystack No. 1 AUM project Quality System.
- Verification that the QA Officer is providing coordination and guidance for the BNSF Haystack No. 1 AUM project Quality System.

At the end of the calendar year, an annual review of these activities is performed by the QA Officer and submitted to the Arcadis Account Manager and/or CPM for the BNSF Haystack No. 1 AUM project. The annual review includes a summary of all internal assessments of the BNSF Haystack No. 1 AUM project Quality System and individual project assessments performed by the QA Officer or DQCs.

2.1.6 References

- ASQ/ANSI E4:2014, Section 4, Management and Organization.
- Arcadis ENV Quality Manual, Section 2, ENV QMS, June 2015

2.2 Quality System

2.2.1 Purpose

The objective of the Arcadis ENV QMS is to provide its clients with a product of known quality. The QMS is intended to include the organization structure, policies and procedures, responsibilities, authorities, resources, requirement documents, and the guidance documents necessary for implementing the quality policy. The system is centered on task elements of planning, implementation, assessment, and improvement. Figure 2 illustrates that execution of these task elements is an iterative process. These technical areas are supported by administrative functions such as procurement of items and services, documentation and records, and use of computer hardware and software. Systems are described fully in the ENV Quality Manual and this Level II QMP that are department-, project-, or contract-specific. Existing Level II documents are included, where applicable, in the reference sections of this manual.

Quality Management Plan

BNSF Haystack No. 1 AUM
May 2017

2.2.2 Scope

This QMP applies to personnel performing work on the BNSF Haystack No. 1 AUM project. The BNSF Haystack No. 1 AUM project Quality System is defined in this QMP that has been written to comply with ASQ/ANSI E4:2014 requirements.

2.2.3 Definitions

Quality System: A structured and documented management system describing the policies, objectives, principles, organizational authority, responsibilities, accountability, and implementation plan of an organization for promoting quality in its work processes, products, and services. A Quality System provides a framework for planning, implementing, and assessing work performed by the organization and for carrying out required QA and quality control (QC).



Quality Management Plan

BNSF Haystack No. 1 AUM
May 2017

2.2.4 Responsibilities

- Arcadis personnel performing work on the BNSF Haystack No. 1 AUM project are responsible for knowing and understanding the project Quality System as described in this QMP and any other supplemental project documentation.
- The QA Officer is responsible for maintaining the QMP and implementing the project Quality System.
- Supervisors are responsible for coordinating the BNSF Haystack No. 1 AUM project Quality System in their projects and verifying that CPMs/APMs in their respective business units know and understand the project Quality System.
- Management is responsible for providing the resources for the BNSF Haystack No. 1 AUM project Quality System, QMP, and necessary associated assessments.

2.2.5 Procedures

- The Quality System for the BNSF Haystack No. 1 AUM project is shown in Figure 3, which identifies the components at the policy, organization, and project levels and the interrelation between these components.
- Each project, program, or contract develops quality procedures (QPs), PQPs, CQPs, and QAPPs and manuals as necessary for implementation of the BNSF Haystack No. 1 AUM project Quality System. These are consistent with the policies expressed in this manual and written in compliance with established written procedures when available (i.e., ASQ/ANSI E4:2014).
- The BNSF Haystack No. 1 AUM project Quality System procedures, plans, and manuals are reviewed by the QA Officer to verify compliance. This QMP is reviewed on an annual basis by the Quality Consultant and Arcadis Account Manager and/or CPM for the project.
- The Arcadis personnel develop QA/QC or other quality plans for projects as required by clients or by the ENV QMS. This planning is consistent with this QMP and any quality guidelines or requirements established by our clients.
- Depending on workload or technical expertise, the QA Officer may delegate authority to another representative for specific projects.

Quality Management Plan

BNSF Haystack No. 1 AUM
May 2017

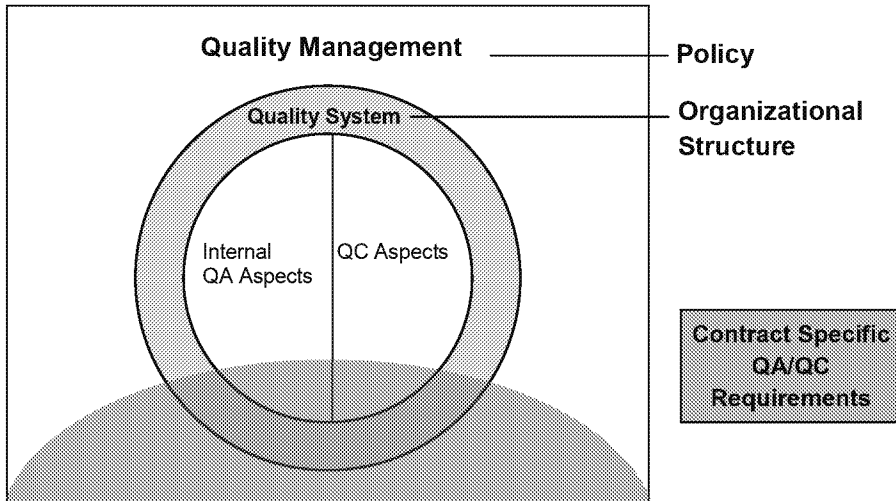


Figure 3 Quality System Concept

2.2.6 Documentation and Records

QMS documentation is the responsibility of the ENV QMS Director and team. The ENV QMS is described in the ENV Quality Manual. This QMP, which is Level II documentation, is prepared by CPMs/APMs, Account Managers, QA personnel, or Supervisors to describe specific contract, program, or project activities.

2.2.7 References

- ASQ/ANSI E4:2014, Section 4, Management and Organization
- Arcadis ENV Quality Manual, Section 3, ENV QMS Components and Systems, June 2015

2.3 Competence of Personnel

2.3.1 Purpose

The purpose of this procedure is to staff Arcadis projects performed for the BNSF Haystack No. 1 AUM project with personnel who are qualified and adequately trained, and that evidence of this training is documented and maintained.

Quality Management Plan

BNSF Haystack No. 1 AUM
May 2017

2.3.2 Scope

These procedures cover training and professional development of Arcadis staff working on the BNSF Haystack No. 1 AUM project and should also be applied to any work done by any subcontractor on behalf of Arcadis.

2.3.3 Responsibilities

- Supervisors are responsible for verifying that assigned staff have the proper technical, health and safety, and managerial skills to perform the assigned task.
- CPMs/APMs are responsible for assessing staff qualifications and identifying specific training needs.
- Supervisors are responsible for annually assessing staff performance and identifying specific training or skills necessary for employee advancement.
- The Health and Safety Officer is responsible for maintaining documentation of staff health and safety, Occupational Safety and Health Administration (OSHA), and Resource Conservation and Recovery Act (RCRA) compliance training.
- The ENV QMS Director is responsible for making QMS training available to staff members.
- Human Resources staff maintains a personnel file on Arcadis personnel, which contains relevant qualifications or training certificates.

2.3.4 Procedures

- Supervisors identify general training needs by evaluating staff qualifications, experience, and performance with respect to job descriptions and documented and performance expectations. General training needs should be assessed and documented on at least an annual basis.
- The ENV QMS Director develops an annual training program on the QMS.
- CPMs/APMs identify specific training needs by evaluating assigned staff qualifications, experience, and performance with respect to requirements of a scope of work.

Quality Management Plan

BNSF Haystack No. 1 AUM
May 2017

- Supervisors perform annual performance evaluation reviews for each employee under their supervision to identify strengths and weaknesses in the employee's performance. These reviews are submitted to Human Resources and maintained in the employee's file.
- CPMs/APMs, Supervisors, and Task Managers attend management training specified by Supervisors. Human Resources Department documents staff training through Arcadis' on-line training center.
- Training resources are identified in each Supervisors budget. Training costs are tracked and documented by each Supervisor.

2.3.5 Documentation and Records

Arcadis' Human Resources Department maintains records to document management and technical training attended by each staff member. Health and Safety-related training documentation is maintained by the Arcadis Health and Safety Officer.

2.3.6 References

- ASQ/ANSI E4:2014, Section 4.4.2, Competence of Personnel.

2.4 Guidelines on Acquisition of Items and Services

2.4.1 Purpose

The purpose of this procedure is to guide the procurement of items and services for use on the BNSF Haystack No. 1 AUM project that are of the type and quality necessary for their intended use.

2.4.2 Scope

The scope includes items and services for activities performed by Arcadis staff on the BNSF Haystack No. 1 AUM project, including work performed for internal or external customers, under project or overhead charges, in scientific or administrative areas, and in data gathering and data interpretation activities.

2.4.3 Definitions

Service: The results generated by activities at the interface between the supplier and the customer, and by supplier internal activities to meet customer needs. Such activities in environmental programs include planning, design, inspection, laboratory and/or field analysis, QA/QC reporting, repair, and installation.

Quality Management Plan

BNSF Haystack No. 1 AUM
May 2017

Supplier: An individual or organization furnishing items or services or performing work according to an agreement between two parties, such as a contract or financial assistance agreement. This is an all-inclusive term used in place of the following: vendor, seller, contractor, subcontractor, fabricator, or consultant.

Customer: A person or organization that sponsors research and development activities or requests products, data, or services in return for that sponsorship.

2.4.4 Responsibilities

- Arcadis staff are responsible for evaluating an item or service to be used in terms of the quality requirements of the work to be performed.
- Arcadis management provides an administrative system that supports this requirement.
- The Arcadis Purchasing Agent is responsible for controlling purchase orders and timely incorporation of pertinent technical and quality requirements, including authorized changes.
- The Health and Safety Officer is responsible for approving the purchase of pressurized cylinders, chemicals, and/or hazardous materials.
- The Arcadis Property Administrator documents and tracks items purchased for specific contracts.

2.4.5 Procedures

- Procedures for establishing, specifying, and maintaining records of quality for purchased products and equipment are established for each program or contract.
- Procedures for verifying that procurement documents contain required information are established and documented.
- Procedures and authority for review of procurement documents are established and documented. This includes approval by the Health and Safety Officer of purchases involving pressurized cylinders, chemicals, and/or hazardous materials.
- Procedures to seek competition for procurements, when possible, are established and documented.

Quality Management Plan

BNSF Haystack No. 1 AUM
May 2017

- Procedures for verifying that subcontractors meet QA requirements and have an adequate quality system are established by this QMP.
- Procedures are established by the Arcadis Account Manager for verifying that subcontractors' products meet quality requirements as specified in statements of work to the subcontractor.

2.4.6 Documentation and Records

The Arcadis Purchasing Department is responsible for maintaining permanent records of procurement. Records of supplier performance are also maintained.

2.4.7 References

- ASQ/ANSI E4:2014 Section B.4.7, Guidelines on Acquisition of Items and Services.

2.5 Documented Information

2.5.1 Purpose

The objective of the documentation and records portion of this QMP is to specify standards and procedures for the review, approval, indexing, distribution, security, retention, and retrieval of Arcadis documents and records.

2.5.2 Scope

These procedures are applicable to deliverables to Arcadis clients or customers, including significant internal reports, records, proposals, and other documents.

2.5.3 Definitions

Document: Written or pictorial information describing, defining, specifying, reporting, or certifying activities, requirements, procedures, or results.

Record: A document that furnishes objective evidence of the items or activities and that has been verified and authenticated as technically complete and correct. Records may include photographs, drawings, figures, e-mails, electronic files, magnetic tape, and other data recording media.

Quality Management Plan

BNSF Haystack No. 1 AUM
May 2017

Peer review: A documented critical review of work. Peer reviews are conducted by qualified individuals who are independent of those who performed the work, but are collectively equivalent in technical expertise to those who performed the original work. The peer review is conducted to confirm that activities are technically adequate, competently performed, properly documented, and satisfy established technical and quality requirements.

Editorial review: True document quality requires an editorial review of a type, frequency, and depth appropriate for the document. Editorial reviews range in form from a Line Edit, to Copy Edit, to an in-depth Technical Edit.

2.5.4 Responsibilities

- CPMs/APMs are responsible for verifying that project-related documents and records are managed in accordance with Arcadis corporate policy, ENV policy, and contractual requirements.
- CPMs/APMs are responsible for providing the latest versions of SOPs and forms for activities related to this QMP and the project to the project team.
- CPM/APMs are responsible for reviewing and approving documents and verifying that the proper version of each document is used.
- CPMs/APMs are responsible for verifying that documents are consistently prepared according to ENV quality standards outlined in the ENV Quality Manual. CPMs should also incorporate appropriate editorial review of all project documents.

2.5.5 Procedures

- Deliverables, internal documents, and records are clearly identified by title, date, author or responsible person, and report or document number/name. Project-related information (i.e., contract number, work assignment, and project number) should also be included on the document.
- The CPM/APM is responsible for the preparation of project-related documents and records.
- Documents prepared for external clients are internally peer reviewed prior to submittal.
- Record retention times are based on contractual requirements or follow Arcadis' written policy (See Section 2.5.6).

Quality Management Plan

BNSF Haystack No. 1 AUM
May 2017

2.5.6 References

- ASQ/ANSI E4:2014, Section 4.5, Documented Information.
- Arcadis ENV Quality Manual, Section 3, ENV QMS Components and Systems, June 2015
- Arcadis Record Retention Policy

2.6 Information Technology

2.6.1 Purpose

The purpose of this procedure is to document the specifications for software/hardware installation, modification, and use.

2.6.2 Scope

This procedure is applicable to software/hardware used for experimental design, design analysis, and modeling; operation or process control; environmental databases; and administrative support.

2.6.3 Definitions

Calibration: Comparison of a measurement standard, instrument, or item with a standard or instrument of higher accuracy to detect and quantify inaccuracies and to report or eliminate those inaccuracies by adjustments.

2.6.4 Responsibilities

- Arcadis personnel are responsible for maintaining their computer equipment in a responsible manner.
- The Arcadis Corporate Information Technology (CIT) department will be responsible for the security and proper functioning of each office's local area network. CIT is also responsible for establishing procedures for software installation and licensing agreements.
- CPMs/APMs are responsible for maintaining instrumentation operated by computers and confirming that equipment calibrations are performed. Calibration procedures are established and specified in project QA plans.

Quality Management Plan

BNSF Haystack No. 1 AUM
May 2017

2.6.5 Procedures

- Procedures for installation, testing, use, maintenance, control, and documentation of computer software and hardware that meet the needs of the user are established by each project and are provided by CIT.
- Hardware and software will be controlled at the Arcadis corporate level. If new versions of software or hardware are issued, CIT will be responsible for providing the latest hardware and software to each user. CIT will be responsible for verifying the quality of hardware and software prior to its purchase.
- Modeling or other specialized software will be approved prior to its use by the Account Manager or designate. The quality of the resulting model will be reviewed by a technical expert.
- CIT will identify the best software technology and hardware available to the company. CIT personnel will evaluate new methodologies and technologies to be introduced into the systems. It will be the responsibility of CIT to propose the introduction of new applications and obtain approval for the changes at the Arcadis corporate level before introducing new systems to project offices.
- When needed, CIT representatives will make office visits to maintain systems and review standards in the project offices.
- Procedures for re-calibration of measurement and testing equipment when software changes or modification to hardware are made will be established and documented.

2.6.6 Documentation and Records

CIT will maintain records of company computers, including software capabilities and licensing agreements. CPMs/APMs will maintain records corresponding to their procedures for installation, maintenance, and operation for computer software/hardware at the project level.

2.6.7 References

- ASQ/ANSI E4:2014, Section 4.6, Information Technology.

2.7 Planning

2.7.1 Purpose

The objective of the planning segment of this QMP is to document how individual operations are planned so that data or information collected is of the needed and expected quality for their intended use.

Quality Management Plan

BNSF Haystack No. 1 AUM
May 2017

2.7.2 Scope

Planning activities are applicable to work done within Arcadis, whether it is for internal or external clients.

2.7.3 Definitions

Quality Management Plan (QMP): A formal document or manual, usually prepared once for an organization, that describes the quality system in terms of the organizational structure; functional responsibilities of management and staff; lines of authority; and required interfaces for those planning, implementing, and assessing the activities conducted.

Quality Assurance Project Plan (QAPP): A formal document describing in comprehensive detail the necessary QA, QC, and other technical activities that must be implemented to obtain the results of the work performed that will satisfy the stated performance criteria.

2.7.4 Responsibilities

- Arcadis personnel are responsible for planning and properly documenting activities.
- CPMs/APMs are responsible for establishing procedures and resources that are adequate to document project planning.
- The Quality Consultant is responsible for providing input to CPMs/APMs during planning activities and reviewing contract management plans and PQPs and/or QAPPs.

2.7.5 Procedures

- Procedures for identifying technical and quality goals that meet the needs and expectations of the client are established. The U.S. Environmental Protection Agency's (USEPA's) Data Quality Objective (DQO) Process is suggested (See Section 2.7.7).
- Procedures for documentation are established. These include measurement requirement capability and design compatibility considerations.

Quality Management Plan

BNSF Haystack No. 1 AUM
May 2017

2.7.6 Documentation and Records

CPMs/APMs are responsible for maintaining records of planning activities. They are also responsible for providing the QA Manager with copies of planning documents.

2.7.7 References

- ASQ/ANSI E4:2014, Section 4.8, Planning.
- Arcadis ENV Quality Manual, Section 4, Quality Integration with the Arcadis Project Management System, June 2015
- USEPA QA/G-5, Guidance for Quality Assurance Project Plans, EPA/240/R-02/009, December 2002.
- USEPA QA/G-4, Guidance on Systematic Planning using the Data Quality Objective Process, EPA/240/B-06/001, February 2006.
- USEPA QA/R-2, EPA Requirements for Quality Management Plans, EPA/240/B-01/002, Reissued May 2006.

2.8 Operation

2.8.1 Purpose

The purpose of this procedure is to document how work will be executed so that work performed is of the required quality.

2.8.2 Scope

This scope of this process applies to activities performed internally and externally by Arcadis.

2.8.3 Definitions

Standard Operating Procedure (SOP): A written document that details the method for an operation, analysis, or action with thoroughly prescribed techniques and steps, and that is officially approved as the method for performing certain routine or repetitive tasks.

Quality Management Plan

BNSF Haystack No. 1 AUM
May 2017

2.8.4 Responsibilities

- Arcadis personnel are responsible for performing work according to documented plans and documenting any plan changes that have been approved by management.
- CPMs/APMs are responsible for providing suitable procedures and making them available for correctly performing planned work.
- Supervisors and the Quality Consultants and/or DQCs are responsible for providing and documenting adequate implementation procedures.

2.8.5 Procedures

- SOPs for routine or repetitive tasks are prepared by Arcadis personnel and are reviewed and approved by CPMs/APMs and the Quality Consultant and/or DQC.
- CPMs/APMs maintain SOPs and adequately document revisions or deviations.
- The Quality Consultant periodically performs assessments to verify that work processes are properly implemented according to plan.

2.8.6 Documentation and Records

CPMs/APMs maintain records of procedures for projects assigned to them. They also provide the Quality Consultant and/or DQC with copies of written procedures for review.

2.8.7 References

- ASQ/ANSI E4:2014, Section 4.9, Operation.
- Arcadis ENV Quality Manual, Section 4, Quality Integration with the Arcadis Project Management System, June 2015
- USEPA QA/G-6, Guidance for Preparing Standard Operating Procedures, EPA/600/B-07/001, April 2007.

Quality Management Plan

BNSF Haystack No. 1 AUM
May 2017

2.9 Performance Evaluation

2.9.1 Purpose

The objective of the assessment and response portion of this QMP is to present a process for assessing activities to measure the effectiveness of the implemented project Quality System.

2.9.2 Scope

The scope of this procedure includes work performed by Arcadis.

2.9.3 Definitions

Management self-assessment:	The qualitative evaluation of a particular program operation and/or organizations(s) by those immediately responsible for overseeing and/or performing the work to establish whether the prevailing management structure, policies, practices, and procedures are adequate for obtaining the type and quality of results needed.
Management independent assessment:	The qualitative evaluation of a particular program operation by someone other than the group performing the work (either internal or external to the organization) to establish whether the prevailing management structure, policies, practices, and procedures are adequate for obtaining the type and quality of results needed.
Nonconformance:	A deficiency, discrepancy, or noncompliance in characteristics, documentation, or procedures that render the quality of an item or activity unacceptable or indeterminate.
Technical self-assessment:	The evaluation process used by those immediately responsible for overseeing and/or performing the work to measure the performance or effectiveness of an operation or system and its elements with respect to documented specifications and objectives. Such assessments could be qualitative or quantitative evaluations.

Quality Management Plan

BNSF Haystack No. 1 AUM
May 2017

Technical independent assessment:	The evaluation process used by someone other than the group performing the work to measure the performance or effectiveness of a technical system and its elements with respect to documented specifications and objectives. Such assessments could be qualitative or quantitative evaluations.
Project Progress Review:	Process for confirming that the project team is providing the best service possible. A brief summary is provided to management of important aspects of a project.
Corrective action:	The response taken to eliminate or mitigate the causes of an existing nonconformance, deficiency, or unsatisfactory situation.

2.9.4 Responsibilities

- The Arcadis management in cooperation with the ENV QMS Director is responsible for providing regular assessment of the QMS.
- Account Managers are responsible for conducting monthly project progress reviews with each CPM/APM.
- CPMs/APMs are responsible for providing regular assessment of subcontractor work processes under their authority.

2.9.5 Procedures

- The QA Officer performs routine internal audits of the quality systems of specific projects under his/her responsibilities.
- The Account Manager holds monthly progress reviews on each project that will include an assessment of how well client objectives are being met; status of project plans, budgets, and schedules; status of change orders; status of quality and professional reviews; and status of accounts receivable.
- CPMs/APMs perform routine assessments of project progress.
- DQCs perform routine assessments of project activities under their supervision and report to the Account Manager and/or CPM/APM.

Quality Management Plan

BNSF Haystack No. 1 AUM
May 2017

2.9.6 Documentation and Records

- The Quality Consultant and/or DQC are responsible for documenting and reporting internal assessments.
- The Account Manager is responsible for documenting performance of monthly project reviews.
- The CPM/APM assessments are conducted annually and documented in personnel files.

2.9.7 References

- ASQ/ANSI E4:2014, Section 4.10, Performance Evaluation.
- Arcadis ENV Quality Manual, Section 4, Quality Integration with the Arcadis Project Management System, June 2015.

2.10 Quality Improvement

2.10.1 Purpose

The purpose of this procedure is to establish a process that promotes continuous improvement of the BNSF Haystack No. 1 AUM project Quality System.

2.10.2 Scope

Quality improvement encompasses Arcadis staff in the performance of work processes and delivery of products or services for internal and external customers.

2.10.3 Definitions

Quality improvement:	A management program for improving the quality of operations and delivery systems. Such management programs generally entail a formal mechanism for encouraging worker recommendations with timely management evaluation and feedback or implementation.
Account Manager:	A senior staff member with a proven record of success in client satisfaction and in project profitability. The Account Manager monitors the client's satisfaction with the project and conducts a client evaluation of the project team's performance.

Quality Management Plan

BNSF Haystack No. 1 AUM
May 2017

2.10.4 Responsibilities

- Arcadis management is responsible for quality and is the leader in the CIP. Resources are provided to carry out the improvement processes.
- Arcadis personnel are responsible for participating in CIP by identifying customers and suppliers, identifying process improvement opportunities, identifying problems, and offering solutions.
- Arcadis management is responsible for empowering staff members and educating personnel on CIP practices.
- The Account Manager is responsible for conducting monthly project progress reviews.

2.10.5 Procedures

- An Account Manager is established for each major client. The Account Manager maintains a relationship with the customer and reports client concerns to the CPM/APM or Operations Management.
- The Account Manager conducts monthly project progress reviews with each CPM/APM under his/her sponsorship.

2.10.6 Documentation and Records

The Account Manager documents and maintains records of monthly project progress reviews.

2.10.7 References

- ASQ/ANSI E4:2014, Section 4.11, Quality Improvement.
- Arcadis ENV Quality Manual, Section 6, Continuous Improvement Program, June 2015

Quality Management Plan

BNSF Haystack No. 1 AUM
May 2017

3. Part B – Collection and Evaluation of Environmental Information

3.1 Planning and Scoping

3.1.1 Purpose

The purpose of this procedure is to adequately plan and document work involving the generation, acquisition, and use of environmental data to obtain the type and quality of environmental data sufficient for the intended use.

3.1.2 Scope

Project-specific planning involves the key users and customers of the data as well as the technical staff responsible for obtaining, analyzing, and evaluating the data.

3.1.3 Definitions

Data Quality Objective (DQO):	Qualitative and quantitative statements of the level of uncertainty that a decision maker is willing to accept in the estimates and/or decisions made with environmental data.
Task Package:	Work Assignment Work Plans are comprised of one or more tasks to be completed. The Task Package is the organization and documentation for a part of a project that has a deliverable (either external or internal) and can be executed by a definable team.
Task Package Document:	A written summary of the information necessary to conduct the Task Package and includes the signatures of the assigning CPM and the receiving APM or Task Manager.
Quality Assurance Project Plan (QAPP):	A formal document describing in comprehensive detail the necessary QA, QC, and other technical activities that must be implemented to obtain the results of the work performed that will satisfy the stated performance criteria.

Quality Management Plan

BNSF Haystack No. 1 AUM
May 2017

3.1.4 Responsibilities

- CPMs/APMs are responsible for implementing and documenting planning procedures for projects under their purview.
- CPMs/APMs are responsible for guiding planning activities and informing and obtaining the understanding of participants of the requirements of the project.
- CPMs/APMs are responsible for preparing a Task Package for any part of a project that has a deliverable and assigning a Task Manager if the work is sent out to an outside party.
- Direct management of a Task Package is assigned to an APM or Task Manager who is responsible for executing the task, delivering the product, and managing the resources assigned in the Task Package.
- The Quality Consultants and/or DQCs are responsible for working with CPMs/APMs to verify that QA requirements are adequate and are documented in PQPs and/or QAPPs.

3.1.5 Procedures

- Projects generating environmental data are planned using a systematic process that identifies and documents research objectives, critical measurements, and acceptable levels of uncertainty for the decision. USEPA's DQO Process is an acceptable means of determining these elements.
- CPMs/APMs prepare Task Packages for work deliverables.
- Results determined from the systematic process are incorporated into the design of the project and documented in a PQP and/or QAPP.
- A systematic assessment is performed on data generated to confirm that it conforms to the established criteria.

3.1.6 Documentation and Records

CPMs/APMs are responsible for maintaining documentation of project planning activities for projects under their purview. Task Packages are prepared to document project objectives.

Quality Management Plan

BNSF Haystack No. 1 AUM
May 2017

3.1.7 References

- ASQ/ANSI E4:2014, Section 5.2, Planning and Scoping.
- Arcadis ENV Quality Manual, Section 4, Quality Integration with Arcadis Project Management System, June 2015
- USEPA QA/G-4, Guidance on Systematic Planning using the Data Quality Objective Process, EPA/240/B-06/001, February 2006.
- USEPA QA/G-5, Guidance for Quality Assurance Project Plans, EPA/240/R-02/009, December 2002.
- USEPA QA/G-9R, Data Quality Assessment: A Reviewer's Guide, EPA/240/B-06/002, February 2006.

3.2 Design of Information Collection Operations

3.2.1 Purpose

The purpose of this procedure is to define, control to the extent required, verify, and document the design of data collection operations.

3.2.2 Scope

This procedure is applicable to data collection operations, including those conducted by external contractors.

3.2.3 Responsibilities

- Arcadis management is responsible for establishing and supporting processes for the completion of the documentation design activities.
- The CPM is responsible for identifying the technical/professional standards that will be used to conduct the Task Package and communicating them to the APMs/Task Managers.
- CPMs/APMs and the Quality Consultant and/or DQC are responsible for confirming that design procedures are properly implemented by performing assessments during data collection operations.
- APMs/Task Managers are responsible for verifying that the project team follows documented standards.

Quality Management Plan

BNSF Haystack No. 1 AUM
May 2017

- Arcadis personnel are responsible for following planned design and documenting any deviations that have been approved by the CPM/APM.

3.2.4 Procedures

- The design of environmental operations utilizes consensus-accepted experimental design techniques, including the use of statistics, when possible.
- Planning documents from the design process may include Task Packages, sampling and analysis plans, instruction guides, project-specific SOPs, or operating manuals.
- Planning documents are maintained by the CPMs/APMs and the Quality Consultant and/or DQC are responsible for supporting the project.
- When subcontractors are participating in project, approved planning documents are binding on all participating groups.

3.2.5 Documentation and Records

Specific project data reporting requirements are documented in planning documents generated prior to taking environmental data. Planning documents detail project-specific data reporting requirements, data validation and verification methods, costs/schedule, health and safety concerns, field and laboratory QA/QC activities, and other key variables that affect the quality of results.

3.2.6 References

- ASQ/ANSI E4:2014, Section 5.3, Design of Information Collection Operations.
- Arcadis ENV Quality Manual, Section 4, Quality Integration with the Arcadis Project Management System, June 2015
- USEPA QA/R-5, EPA Requirements for QA Project Plans, EPA/240/B-01/003, Reissued May 2006.
- USEPA QA/G-6, Guidance for Preparing Standard Operating Procedures, EPA/600/B-07/001, April 2007.

Quality Management Plan

BNSF Haystack No. 1 AUM
May 2017

3.3 Performance of Planned Operations

3.3.1 Purpose

The purpose of this procedure is to document the processes used to verify that environmental data operations are implemented by qualified personnel according to the approved applicable planning documents.

3.3.2 Scope

This procedure is applicable to projects performed by Arcadis that generate environmental data.

3.3.3 Definitions

Chain-of-Custody: An unbroken trail of accountability that documents the physical security of samples, data, and records.

Standard Operating Procedure (SOP): A written document that details the method for an operation, analysis, or action with thoroughly prescribed techniques and steps, and that is officially approved as the method for performing certain routine or repetitive tasks.

3.3.4 Responsibilities

- CPMs/APMs are responsible for verifying that operations are carried out according to plan.
- CPMs/APMs are responsible for documenting problems affecting schedule or cost.
- CPMs/APMs are responsible for adequately documenting the procedures described below.
- The Quality Consultant and/or DQC are responsible for verifying that operations are carried out according to plan and that procedures are adequately documented.
- Arcadis personnel are responsible for performing operations according to plan and documenting deviations from the plan as approved by the CPM/APM.

Quality Management Plan

BNSF Haystack No. 1 AUM
May 2017

3.3.5 Procedures

- CPMs/APMs conduct or assign performance inspections and acceptance testing of sampling, measurement, and analytical instrumentation and their components to confirm the intended use of the items as specified by the design. There are written procedures for the performance of these activities, and they are documented as they are performed.
- CPMs/APMs communicates information on the List of Unresolved Problems to the project team on a regular basis.
- Tools; gauges; instruments; and other sampling, measuring, and testing equipment used for activities are calibrated to maintain accuracy within specified limits. Evidence of calibrations and performance are adequately documented.
- Periodic preventive and corrective maintenance of measurement and testing equipment is performed and documented.
- SOPs are established for the handling, storage, cleaning, packaging, shipping, and preservation of field and laboratory samples to prevent damage, loss, deterioration, artifacts, or interference.
- SOPs are prepared to describe data or information management, including transmittal, storage, validation, assessment, processing, and retrieval.

3.3.6 Documentation and Records

CPMs/APMs are responsible for maintaining the implementation documents and providing the QA Manager with this documentation.

3.3.7 References

- ASQ/ANSI E4:2014, Section 5.4, Performance of Planned Operations.
- Arcadis ENV Quality Manual, Section 4, Quality Integration with the Arcadis Project Management System, June 2015
- USEPA QA/G-6, Guidance for Preparing Standard Operating Procedures, EPA/600/B-07/001, April 2007.

Quality Management Plan

BNSF Haystack No. 1 AUM
May 2017

3.4 Performance Evaluation

3.4.1 Purpose

The purpose of this procedure is to regularly assess activities performed during environmental data operations that affect the quality of the data, report the findings to management, and verify that the requirements stated in planning documents are being implemented as described.

3.4.2 Scope

This procedure includes all performed by Arcadis that generates environmental data.

3.4.3 Definitions

Technical Systems Audit: A thorough systematic, on-site, qualitative audit of facilities, equipment, personnel training procedures, record keeping, data validation, data management, and reporting aspects of a system.

Performance Evaluation Audit: Quantitative data independently generated in a measurement system compared with routinely obtained data to evaluate the proficiency of a laboratory or analyst.

Data Quality Audit: Assessment of the methods used to collect, interpret, and report information required to characterize data quality, which requires a detailed review of: (1) recording and transfer of raw data, (2) data calculations, (3) documentation procedures, and (4) the selection and discussion of appropriate DQIs.

Finding: An assessment conclusion that identifies a condition having significant effect on an item or activity. An assessment finding may be positive or negative and is normally accompanied by specific examples of the observed condition.

Observation: An assessment conclusion that identifies a condition (either positive or negative) that does not represent a significant impact on an item or activity.

Quality Management Plan

BNSF Haystack No. 1 AUM
May 2017

Internal Audit: An assessment performed by a qualified individual within the organization being audited, but not directly involved in the data collection activities or the work being assessed.

External Audit: An assessment performed by a qualified individual, group, or organization that is not part of the organization directly performing and accountable for the work being assessed.

3.4.4 Responsibilities

- CPMs/APMs are responsible for developing and performing assessment procedures for their data collection activities to verify that the data obtained is of a known quality.
- CPMs/APMs are responsible for corrective actions identified in the List of Unresolved Problems or during internal or external audits.
- CPMs/APMs are responsible for cooperating with QA personnel during internal or external audits.
- The Quality Consultant and/or DQC are responsible for confirming that assessment procedures meet client and Arcadis requirements.
- The Quality Consultant and/or DQC are responsible for performing routine assessments by auditing projects under review.

3.4.5 Procedures

- The CPM/APM regularly assesses project activities and determines when corrective actions are necessary and that corrective actions are adequately documented in project files.
- The Quality Consultant and/or DQC perform internal audits to verify that projects are performed according to plan. Audit findings and observations are documented in reports submitted to the CPM/APM.

3.4.6 Documentation and Records

The CPM/APM maintains project files that document project activities, assessments, and corrective actions. Assessment findings or observations discovered through internal or external audits are documented by the Quality Consultant and/or DQC and reported to the CPM/APM. Necessary corrective actions are determined and implemented by the CPM/APM.

Quality Management Plan

BNSF Haystack No. 1 AUM
May 2017

3.4.7 References

- ASQ/ANSI E4:2014, Section 5.5, Performance Evaluation.
- Arcadis ENV Quality Manual, Section 4, Quality Integration with the Arcadis Project Management System, June 2015

3.5 Assessment and Verification of Information

3.5.1 Purpose

The purpose of this procedure is to express and document any limitations on data usability in reporting of the data.

3.5.2 Scope

This procedure is applicable to work performed by Arcadis that generates environmental data.

3.5.3 Definitions

Accuracy:	The degree of agreement between an observed value and an accepted reference value.
Comparability:	The degree to which different methods, data sets, and/or decisions agree or can be represented as similar.
Completeness:	The amount of valid data obtained compared to the amount of data collected or planned.
Data Quality Indicator (DQI) Goal:	Quantitative descriptors that are used to interpret the degree of acceptability or utility of data to the users, which is usually expressed in terms of accuracy, precision, completeness, representativeness, and reproducibility.
Internal Peer Review:	A documented critical review of work or a publication conducted by an individual within the organization who is independent of those who performed the work or authored the publication.

Quality Management Plan

BNSF Haystack No. 1 AUM
May 2017

Internal QA Review:	A review performed by the Quality Consultant or DQL on a report presenting environmental data. The purpose of the QA review is to confirm that reported data or conclusions are substantiated by appropriate QA/QC activities.
Precision:	The degree to which a set of observations or measurements of the same property, usually obtained under similar conditions, conform to a specified measure of central tendency (e.g., mean).
Representativeness:	The degree to which data accurately and precisely represent the frequency distribution of a specific variable in the population.
Reproducibility:	The extent to which a method, test, or experiment yields the same or similar results when performed on subsamples of the same sample by different analysts or laboratories.

3.5.4 Responsibilities

- CPMs/APMs are responsible for establishing and documenting DQI goals for critical measurements.
- CPMs/APMs are responsible for submitting reports presenting environmental results for internal peer review.
- The Quality Consultant and/or DQC are responsible for internally reviewing reports presenting environmental data prepared by Arcadis.
- The CPM and/or APM are responsible for ensuring that reports containing environmental data are not released without an internal peer review.

3.5.5 Procedures

- CPMs/APMs establish DQI goals in terms of accuracy, precision, comparability, completeness, representativeness, and reproducibility that are used to assess data usability.
- CPMs/APMs provide the resources for review of data reports by a senior staff member and the QA Manager or designated QA Officer.
- The Quality Consultant and/or DQC review reports presenting environmental data and confirm that QA/QC activities are properly documented.

Quality Management Plan

BNSF Haystack No. 1 AUM
May 2017

- The CPM works with the APMs/Task Managers to ensure that all documents containing environmental data are reviewed prior to publication.

3.5.6 Documentation and Records

Records (electronic or print) of publications prepared are maintained in the office of the CPM. Records of internal peer review are also maintained in the project files. The Quality Consultant and/or DQC maintain records of internal QA reviews.

3.5.7 References

- ASQ/ANSI E4:2014, Section 5.6, Assessment and Verification of Information.
- Arcadis ENV Quality Manual, Section 4, Quality Integration with the Arcadis Project Management System, June 2015

Quality Management Plan

BNSF Haystack No. 1 AUM
May 2017

4. Part C – Design, Construction, and Operation of Environmental Technology

4.1 Planning and Scoping

4.1.1 Purpose

The purpose of this procedure is to provide a strategy and direction for a project or system with regard to the required specifications, on time completion, resource coordination, and QA throughout the process.

4.1.2 Scope

This procedure is applicable to design related to environmental equipment and to construction and operation tasks to be performed for Arcadis clients.

4.1.3 Definitions

Planning: Establishing goals, procedures, and strategies to complete an assignment. Planning the design, construction, and operation of environmental equipment provides a means of setting priorities and establishing deadlines critical to successful completion of the work assignment or Task Package.

4.1.4 Responsibilities

- CPMs/APMs are responsible for planning the daily tasks required for the completion of the project. The Staff Engineer conforms to and is aware of the project specifications and the overall plan for the project. The Staff Engineer is responsible for equipment, procurement, documentation, and resource management. The Staff Engineer responds to QA audits and responds to requests from the Quality Consultant and or the BNSF Haystack No. 1 AUM project QA Officer.
- Design Group Leaders are assigned to each project and are responsible for overseeing the design and planning of the project. The Design Group Leader makes resources available to the CPM/APM. The Design Group Leader interfaces with the client to understand and verify the acceptance criteria for the system. The Design Group Leader establishes quality standards as guidelines for the CPM/APM.
- The CPM/APM reviews the project planning of the Design Group Leader to comply with the client's technical objectives and required schedule. The CPM/APM and the Quality Consultant perform final reviews on the system prior to submission to the client.

Quality Management Plan

BNSF Haystack No. 1 AUM
May 2017

4.1.5 Procedures

- The planning of the project coincides with the client's requested schedule.
- Coordination with participating organizations is planned to avoid scheduling conflicts.
- Scheduling and resource allocation are internally reviewed for personnel and equipment availability.
- Internal QA audits are routinely performed, and QA records are maintained that document that plans and activities affecting product quality support client satisfaction.

4.1.6 Documentation and Records

- Project schedules are documented and presented to the client. Upon acceptance, these documents are recorded.
- Results of all internal QA audits related to the project planning are recorded.
- Work plans, Task Packages, QAPPs, design criteria, schedules, organizational charts, and conceptual design drawings used in planning the project are documented and recorded.

4.1.7 References

- ASQ/ANSI E4:2014, Section 6.2, Planning and Scoping.

4.2 Design of Systems

4.2.1 Purpose

The purpose of this procedure is to confirm that environmental technology designs adhere to engineering principles and national standards and codes and to enact guidelines and procedures for design reviews.

4.2.2 Scope

This procedure is applicable to design related to environmental equipment or facilities and to construction and operation tasks performed for Arcadis clients.

Quality Management Plan

BNSF Haystack No. 1 AUM
May 2017

4.2.3 Definitions

Specification: A detailed description of a product or process used to establish performance guidelines. The specification may outline acceptable tolerances, accuracies, and operating conditions for a piece of equipment, a process, or a test procedure.

Guidelines: An outline or procedure that establishes a mechanism for reviewing and evaluating a design.

4.2.4 Responsibilities

- The CPM/APM and/or Staff Engineer are responsible for reviewing the project requirements and documenting the required specifications. This may include written specifications, drawings, operational manuals, etc. The CPM/APM may assign a Staff Engineer who is responsible for researching and adhering to the applicable regulatory requirements and national, state, and local codes. The Staff Engineer is responsible for reviewing the product specifications and evaluating potential candidates or competing products. The Staff Engineer works with the Design Group Leader to identify potential safety and reliability issues and methods to solve them.
- The Design Group Leader reviews the specifications and drawings developed by the Staff Engineer. This includes suggesting changes to the design and/or specification. The Design Group Leader determines if the product or service presented by the Staff Engineer meets all the regulatory requirements and national, state, and local laws. The Design Group Leader establishes guidelines for the design review process and confirms that the final design meets the client's requirements. The Design Group Leader interfaces with the CPM/APM to establish a schedule for critical phases of the design and review policies.
- The CPM/APM reviews the project design for compliance with the client's technical objectives and required schedule. The CPM/APM and the Quality Consultant and/or DQL perform final reviews on the design and specifications prior to release.

4.2.5 Procedures

- Specifications for the design are reviewed. Clarification of any issues with the client is performed.
- Drawings and specifications will be issued for client's review. Comments from the client are incorporated into the final design.

Quality Management Plan

BNSF Haystack No. 1 AUM
May 2017

- Design reviews are held at critical phases of the design. Reviewer comments are addressed by the responsible party.
- Internal QA audits occur simultaneously with the design review for acceptable performance, construction, and operation.

4.2.6 Documentation and Records

Documents and records include any drawings and/or written specifications for the project. The drawings and/or specifications include sufficient information to designate components or procedures critical to the construction and operation of the project. Revisions to any drawing after release include a revision mark and date. The Staff Engineer is responsible for documenting any commitments from other organizations participating in the project. Any changes in the scope of work agreed to by the client are documented and recorded.

4.2.7 References

- ASQ/ANSI E4:2014, Section 6.3, Design of Systems.

4.3 Construction/Fabrication of Systems and Components

4.3.1 Purpose

The purpose of this procedure is to produce components which meet or exceed the drawings, specifications, and requirements of the design through construction and fabrication techniques; as well as to calibrate and document the measuring and test equipment used to verify construction tolerances.

4.3.2 Scope

This procedure is applicable to design related to environmental equipment and to construction and operation tasks performed for Arcadis clients.

4.3.3 Definitions

Calibration: Comparison of a measurement standard, instrument, or item with a standard or instrument of higher accuracy to detect and quantify inaccuracies and to report or eliminate those inaccuracies by adjustments.

Quality Management Plan

BNSF Haystack No. 1 AUM
May 2017

4.3.4 Responsibilities

- Arcadis personnel are responsible for calibrating and maintaining test equipment as required by the manufacturer, as shown on the drawing, or as stated in the specification.
- The fabricator or operator will make inspections at the interval or critical step specified.
- The Staff Engineer is responsible for “as built” drawings and verifies the performance or suitability of manufactured systems and components.

4.3.5 Procedures

- Procedures are established to verify that each component or system fabricated or constructed meets the specification and tolerances in the approved design.
- Procedures and frequencies for calibrating measuring and test equipment are established and documented to support accurate and consistent evaluations.
- Components are fabricated or installed in accordance with the accepted design specifications.

4.3.6 Documentation and Records

- Drawings and/or specifications are required to designate the acceptable tolerances and construction techniques for fabrication and assembly.
- Documentation is required to verify acceptance criteria, test equipment calibration, and test results.
- Information verifying the suitability of components and services used in the construction or fabrication process is recorded.

4.3.7 References

- ASQ/ANSI E4:2014, Section 6.4, Construction/Fabrication of Systems and Components.

Quality Management Plan

BNSF Haystack No. 1 AUM
May 2017

4.4 Operation of Environmental Technology

4.4.1 Purpose

The purpose of this procedure is to follow approved operating and preventive maintenance procedures, to verify the proper use of measuring and test equipment, and to validate the traceability of performance standards.

4.4.2 Scope

This procedure is applicable to systems using environmental technology and operated by Arcadis personnel working on the BNSF Haystack No. 1 AUM project.

4.4.3 Definitions

Traceability: A link to a known or nationally recognized performance standard used to establish the credibility and accuracy of measuring and test equipment or system components.

Calibration: Comparison of a measurement standard, instrument, or item with a standard or instrument of higher accuracy to detect and quantify inaccuracies and to report or eliminate those inaccuracies by adjustments.

4.4.4 Responsibilities

- The Staff Engineer is responsible for identifying acceptable materials, measuring and test equipment, operating procedures and parameters, maintenance intervals and procedures, and personnel required for system operation.
- The Staff Engineer is responsible for the consistent and acceptable quality of inputs to the system or process.
- The Staff Engineer reviews the approved operating and test procedures to identify maintenance items, to procure the appropriate parts or materials, and to deploy qualified personnel to perform the maintenance task.
- The Staff Engineer confirms the calibration of the measuring and test equipment and verifies that it is appropriate for the desired test, analysis, or measurement.

Quality Management Plan

BNSF Haystack No. 1 AUM
May 2017

4.4.5 Procedures

- The approved design documentation and operating instructions are reviewed to establish the required operating procedure, to identify maintenance issues, to promote operational safety, and to maintain regulatory compliance.
- Maintenance intervals and procedures are established to support reliable operation of the equipment and systems.
- Measuring and test equipment is calibrated and maintained using the recommended or approved intervals and procedures.

4.4.6 Documentation and Records

- Maintenance procedures are documented.
- The date and description of maintenance work performed on the system is documented and recorded.
- The results of scheduled calibrations are documented and recorded for any measuring and test equipment.
- Documentation showing traceability to recognized standards is maintained.

4.4.7 References

- ASQ/ANSI E4:2014, Section 6.5, Operation of Environmental Technology.

4.5 Performance Evaluation

4.5.1 Purpose

The purpose of this procedure is to assess established guidelines affecting the design, construction, and operation of environmental technology and to take appropriate corrective action if needed.

4.5.2 Scope

This procedure is applicable to systems using environmental technology designed, constructed, or operated by Arcadis personnel working on the BNSF Haystack No. 1 AUM project.

Quality Management Plan

BNSF Haystack No. 1 AUM
May 2017

4.5.3 Definitions

Assessment: Evaluation or comparison of the actual value or status to an accepted standard or benchmark.

4.5.4 Responsibilities

- Arcadis personnel are required to regularly assess the quality of the design, construction, or operation against the established standards, and then take corrective action if required.
- The frequency of assessment will be stated in the planning documentation or as required to maintain quality.

4.5.5 Procedures

- The approved specifications and operating procedures are reviewed to establish the frequency for assessing the factors influencing quality.
- If needed, corrective actions are taken to modify the design or operating procedure to comply with the approved specifications or procedure.

4.5.6 Documentation and Records

- The results of reviews or audits assessing the design, construction, or operation of an environmental technology are recorded. Any corrective actions are documented.

4.5.7 References

- ASQ/ANSI E4:2014, Section 6.6, Performance Evaluation.

4.6 Verification and Acceptance of Systems

4.6.1 Purpose

The purpose of this procedure is to verify that the design, construction, operation, or experimental test meets the performance requirements set forth in the approved design specification.

Quality Management Plan

BNSF Haystack No. 1 AUM
May 2017

4.6.2 Scope

This procedure is applicable to designs related to environmental technology, and environmental technology related construction projects and sampling experiments performed by Arcadis personnel working on the BNSF Haystack No. 1 AUM project.

4.6.3 Definitions

Test plan: A set of procedures or a matrix of experimental conditions used to verify performance of a device or to test the influence of operating conditions on a process.

4.6.4 Responsibilities

- The Staff Engineer or Project Scientist is responsible for verifying the operation and performance of the system or component under investigation.
- If the technology or component fails to meet the approved criteria, the Staff Engineer or Project Scientist takes corrective action and reevaluates the status.

4.6.5 Procedures

- Procedures for testing a technology or system to verify performance and compliance with the accepted specification are developed.
- System or component testing is performed based on the established test plan.
- Corrective action is taken on the systems or components not in compliance. The system or component is then reevaluated to determine if it meets the performance specification. If not, the applicability of the device or system for its intended use is reconsidered.

4.6.6 Documentation and Records

- A test plan for validating the system or component performance is documented.
- The results of the testing are recorded. Any components or systems not performing as required by the accepted specification are noted.
- Corrective action taken on a component or system is documented.

Quality Management Plan

BNSF Haystack No. 1 AUM
May 2017

- If the corrective action does not bring the component or system into compliance, a record explaining the failure and possible cause is generated.

4.6.7 References

- ASQ/ANSI E4:2014, Section 6.7, Verification and Acceptance of Systems.